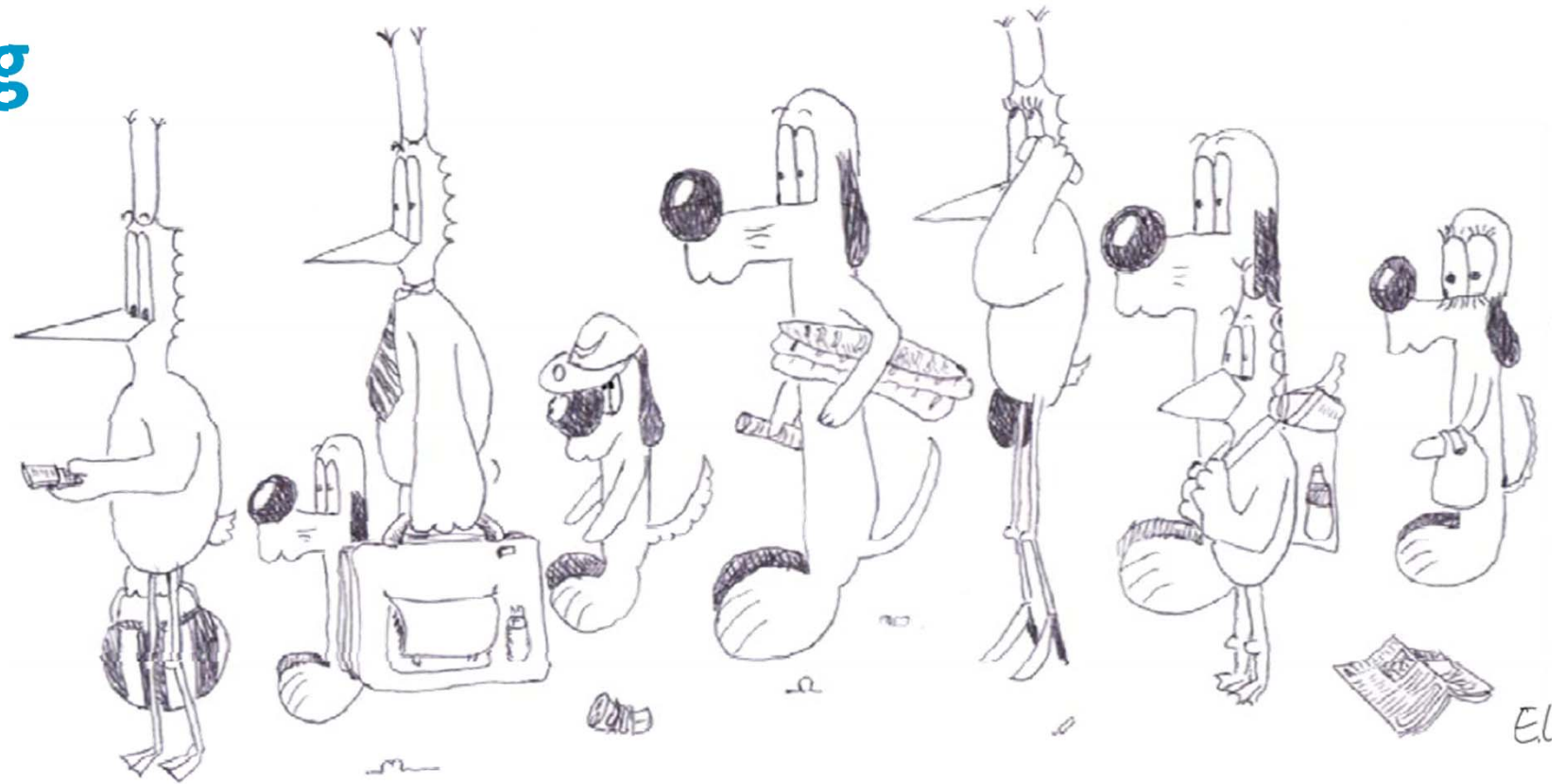


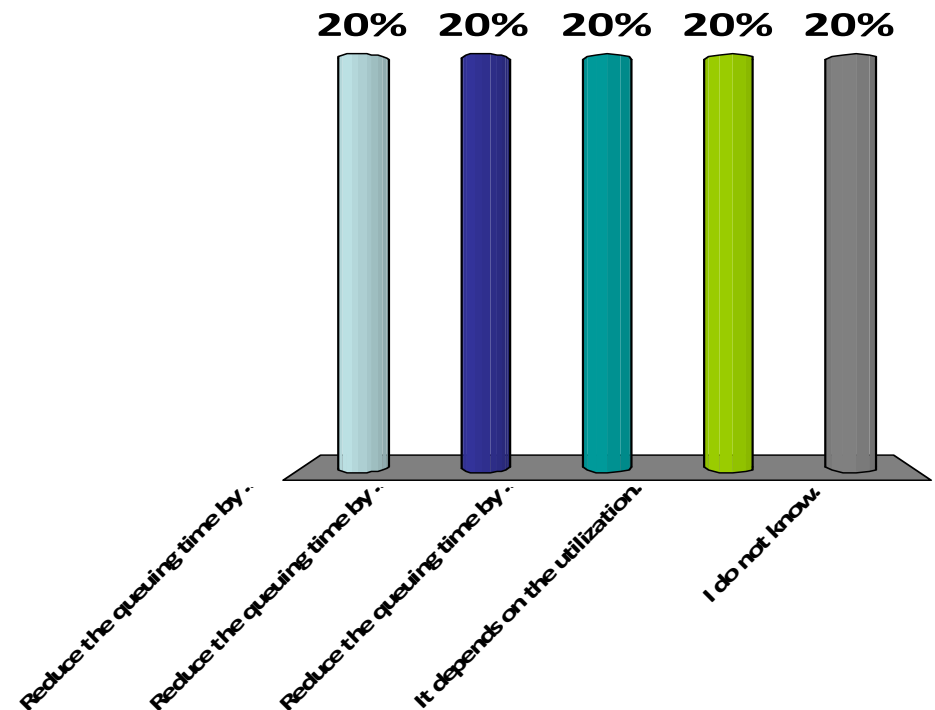
Bonus Queuing



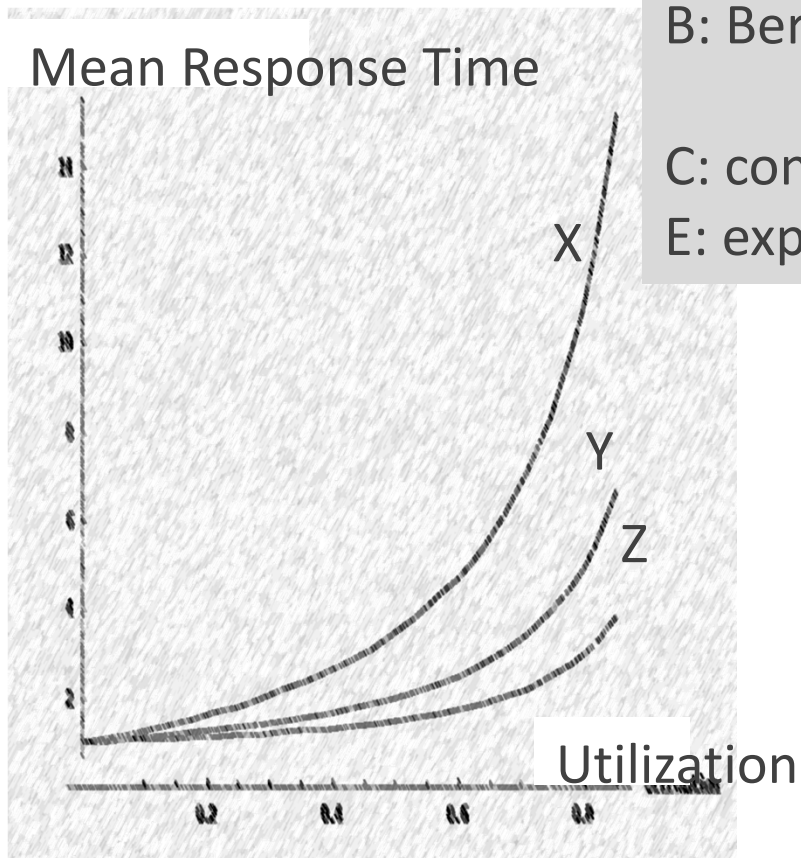
Jean-Yves Le Boudec
2015

An information server can be modelled as an M/GI/1 queue. Doubling the capacity of the server would...

- A. Reduce the queuing time by a factor 2
- B. Reduce the queuing time by a factor larger than 2
- C. Reduce the queuing time by a factor smaller than 2
- D. It depends on the utilization factor
- E. I do not know.

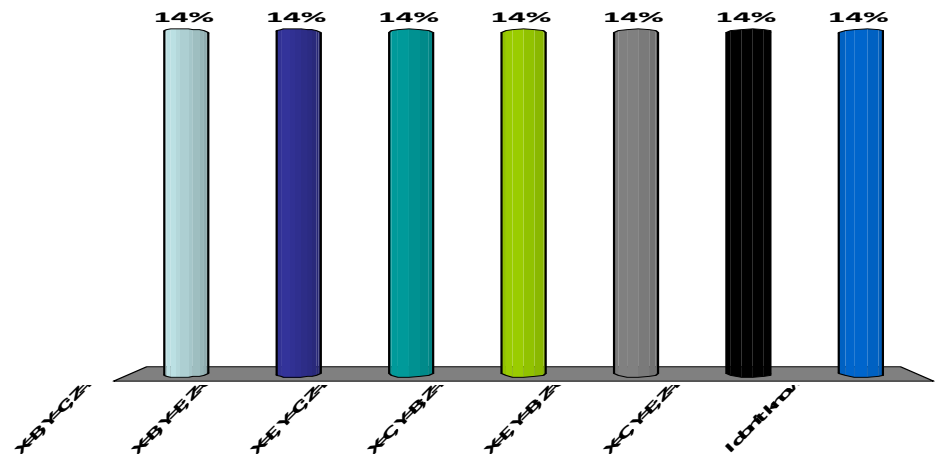


The 3 curves are for an M/GI/1 queue with different distributions of service times. Say which curve is for which distribution.



B: Bernoulli with mean $p = 0.2$
 C: constant
 E: exponential

- A. $X=B, Y=C; Z=E$
- B. $X=B, Y=E; Z=C$
- C. $X=E, Y=C; Z=B$
- D. $X=C, Y=B; Z=E$
- E. $X=E, Y=B; Z=C$
- F. $X=C, Y=E; Z=B$
- G. I don't know



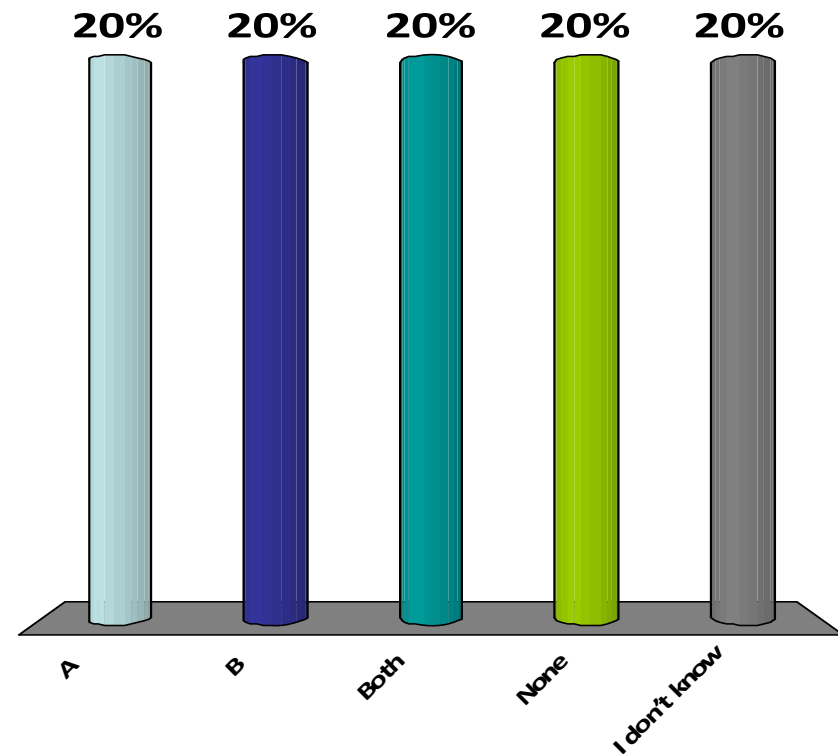
Which sentences are true ?

λ = arrival rate

S = mean service time

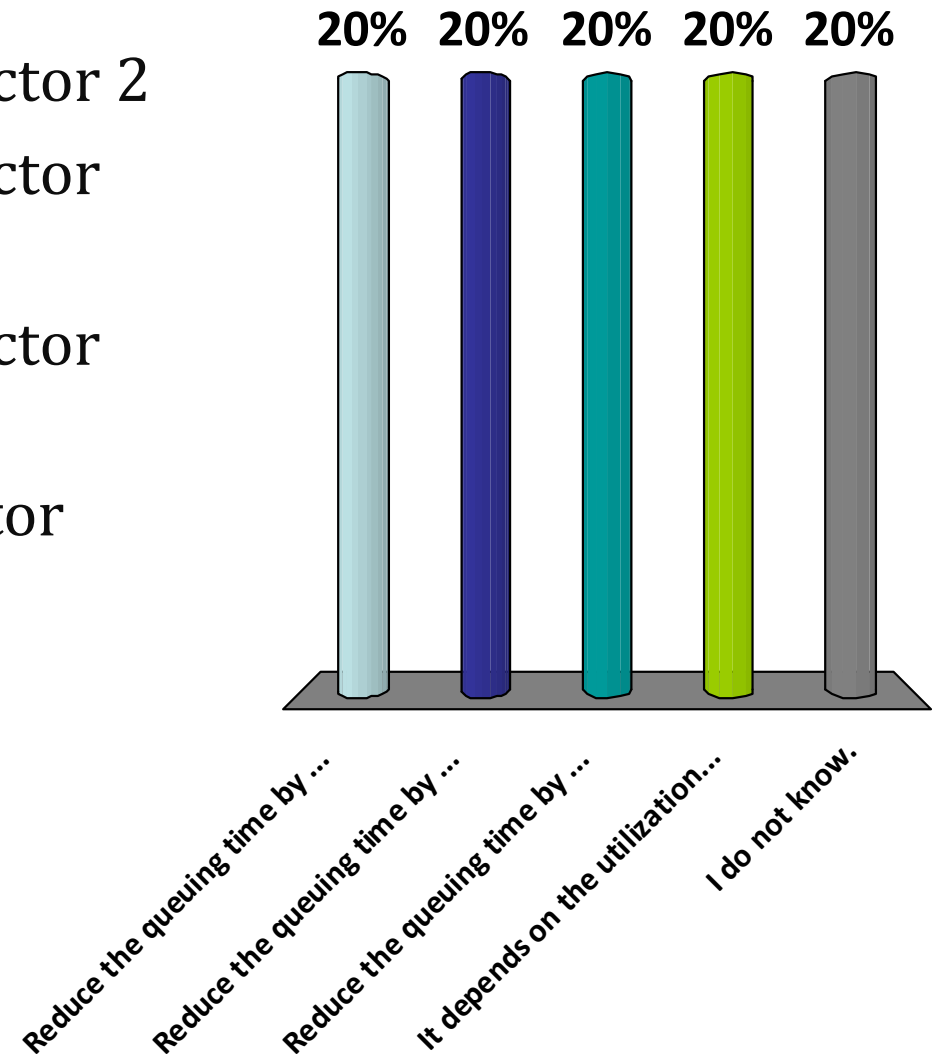
- A. For a single server queue, if $\lambda < \frac{1}{S}$ the queue has a stationary regime
- B. For an M/GI/1 queue, if $\lambda < \frac{1}{S}$ the queue has a stationary regime

- A. A
- B. B
- C. Both
- D. None
- E. I don't know



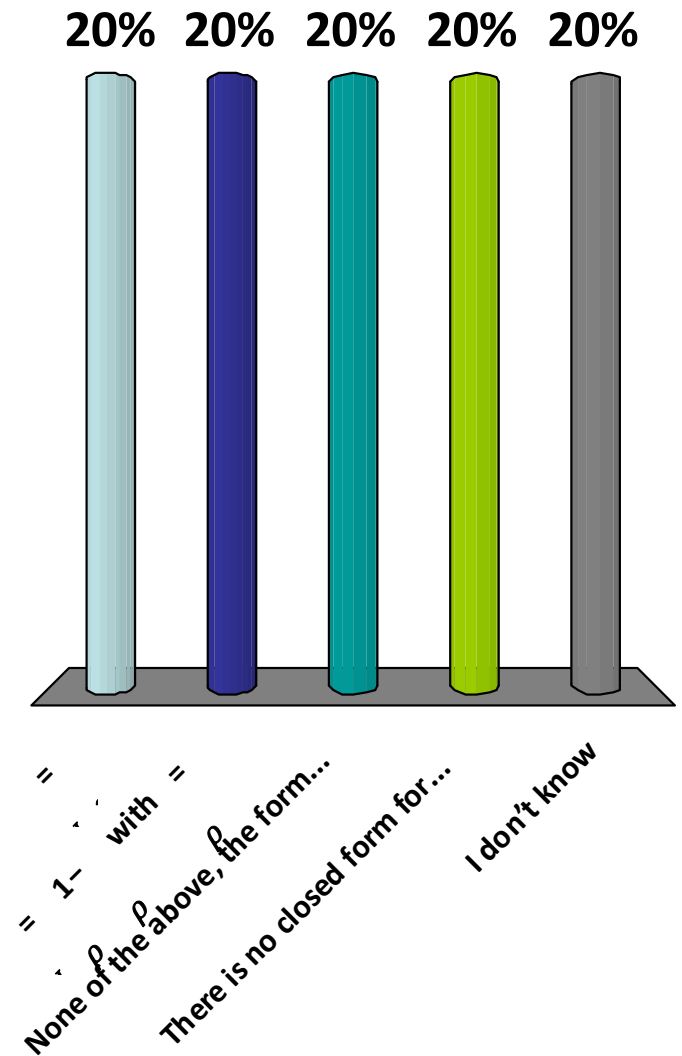
A train with 200 tourists arrive at the skilift. A queue builds up. Doubling the capacity of the skilift would...

- A. Reduce the queuing time by a factor 2
- B. Reduce the queuing time by a factor larger than 2
- C. Reduce the queuing time by a factor smaller than 2
- D. It depends on the utilization factor
- E. I do not know.



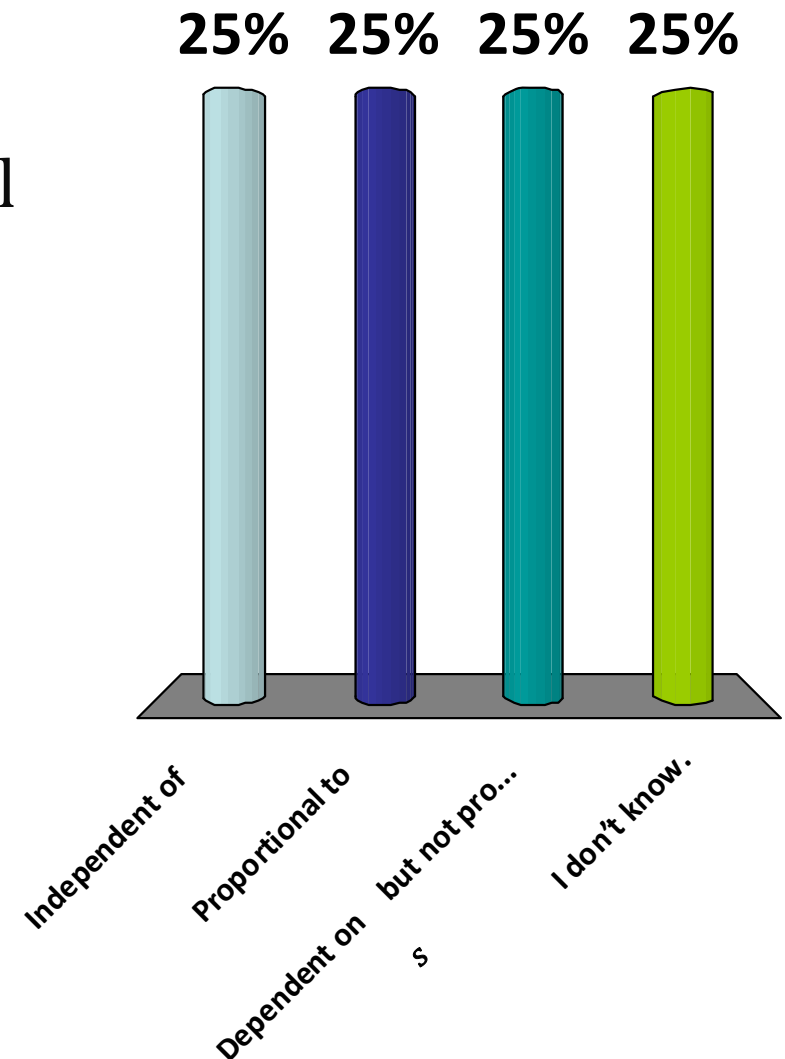
The average number of customers present in an M/GI/ ∞ queue is ... (S is the mean service time)

- A. $N = \lambda S$
- B. $N = \frac{\rho}{1-\rho}$ with $\rho = \lambda S$
- C. None of the above, the formula involves the coefficient of variation
- D. There is no closed form formula
- E. I don't know



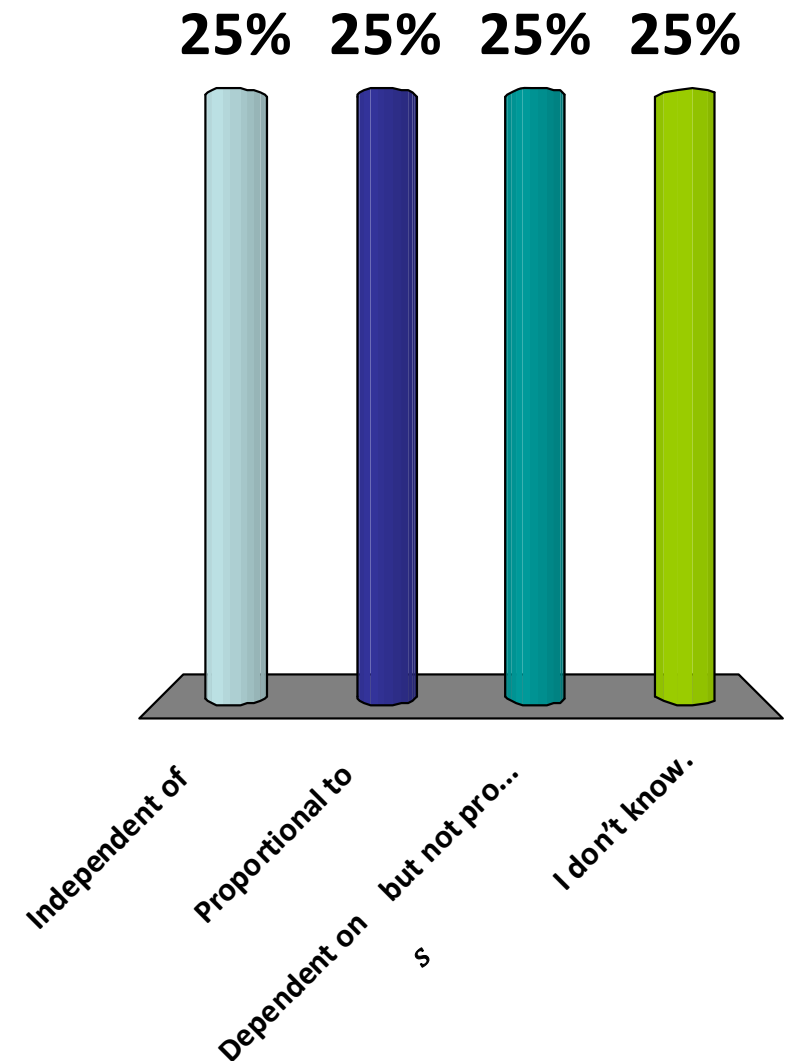
At a FIFO queue, the expected waiting time for a job, given that its service time is s is...

- A. Independent of s
- B. Proportional to s
- C. Dependent on s but not proportional (in general)
- D. I don't know.



At a PS (processor sharing) queue, the expected response time for a job, given that its service time is s is...

- A. Independent of s
- B. Proportional to s
- C. Dependent on s but not proportional (in general)
- D. I don't know.



**N is the number
of skiers
present (in
average).**

**Doubling N
would...**

- A. more than double the waiting time
- B. would not significantly impact the waiting time
- C. less than double the waiting time
- D. none of the above
- E. I don't know

